

REMARKS

This application has been reviewed in light of the Office Action dated June 9, 2003. Claims 2 and 9-15 are pending in this application and have been amended as to matters of form only. These changes do not narrow the scope of any of those claims. Claims 1 and 3 have been cancelled, without prejudice or disclaimer of subject matter. Claim 2 is in independent form. Favorable reconsideration is requested.

The title has been amended as to matters of form.

In response to the Examiner's objection to Claim 12, Applicant has replaced "any one of claims 1" with -claim 2-. Applicant respectfully requests withdrawal of the objection.

The Office Action rejected Claims 1, 2, 9, and 13 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,188,094 B1 (Kochi et al.) in view of U.S. Patent No. 5,237,423 (Goto et al.) and U.S. Patent No. 5,831,258 (Street); Claims 3, 10, and 15 as being unpatentable over Kochi et al. in view of Goto et al. and Street, and further in view of U.S. Patent No. 6,091,449 (Matsunaga et al.); Claim 11 as being unpatentable over Kochi et al. in view of Goto et al. and Street, and further in view of U.S. Patent No. 5,894,325 (Yonemoto); Claim 12 as being unpatentable over Kochi et al. in view of Goto et al. and Street, and further in view of U.S. Patent No. 4,349,743 (Ohba et al.); and Claim 14 as being unpatentable over Kochi et al. in view of Goto et al. and Street, and further in view of U.S. Patent No. 5,898,168 (Gowda et al.). Cancellation of Claims 1 and 3 renders their rejections moot. Applicant respectfully traverses these rejections.

Applicant submits that independent Claim 2, together with the remaining claims dependent thereon, is patentably distinct from the proposed combination of the cited prior art at least for the following reasons.

The aspect of the present invention set forth in Claim 2 is a solid-state

image pickup device that includes at least one unit cell having a photoelectric conversion portion which generates a signal, an amplifying means for amplifying the signal generated in the photoelectric conversion portion, and a transfer means for transferring the signal to the amplifying means. A reset means resets an input terminal of the amplifying means and a selecting means selects the amplifying means and outputs an amplified signal to a signal output line. The signal output line and a line having at least one function of the three functions of a selection control line control the selecting means, a transfer control line controls the transfer means, and a reset control line reset controls the reset means, comprise a single common line in a single unit cell or between two adjoining unit cells.

One important feature of Claim 2 is that the signal output line and a line having at least one function of the three functions of a selection control line for controlling the selecting means, a transfer control line for controlling the transfer means, and a reset control line for controlling the reset means, comprise a single common line in a single unit cell or between two adjoining unit cells. In other words, an important feature of Claim 2 is that one of the functions of a common line is a signal output line. A signal output line, unlike a control line applied for each row, does not obtain a signal for controlling a switch. However, it has been determined by the inventor that a signal output from a sensor can function also as a switch for controlling a unit cell by suitably designing a unit-cell circuit. Generally, a control line is formed in a plural number parallel to each other in a lateral direction. However, since the signal output line is formed in a vertical direction, even when it is used also as other control lines, the circuit's design can be improved remarkably.

Kochi et al. relates to a solid-state image pickup device. The Office Action at page 3 states that Kochi et al. discloses a solid-state image pickup device comprising at least one unit cell having a photoelectric conversion portion which generates a signal, an amplifying means, a transfer means, a reset means, and a selecting means as recited in

Claim 2. Applicant submits, however, that nothing has been found in Kochi et al. that would teach or suggest a common line having two different functions. The Office Action stated that the line to which $\Phi TX(n+1)$ is applied in Figure 7 is considered to be a first common line. However, as shown in Figure 7, the line referred to by the Examiner merely controls the transfer means 911 of laterally adjacent plural pixels. The Office Action also stated that the line to which $\Phi SEL(n+1)$ is applied in Figure 7 is considered to be a second common line. However, as shown in Figure 7, the line referred to by the Examiner merely controls the selecting means 904 of laterally adjacent plural pixels. Thus, the image pickup device of Kochi et al., at most, controls a plurality of pixels simultaneously but nothing in Kochi et al. would teach or suggest one line that has a plurality of different functions, as recited in Claim 2.

Goto et al., as understood by Applicant, relates to a multi-chip solid-state image sensing device. Goto et al. discusses a line sensor with a common line that controls two different functions of resetting and selecting between two unit pixels operating in a time-series fashion, as shown for example, in Figure 1, read pulse 9_2 controls 4_1 and select gate 5_2 .

Street, as understood by Applicant, relates to a pixel circuit with an integrated amplifier. Street discusses (as shown in Figure 2) that, for example, control line G_{n+1} controls both selecting means 218 and resetting means 204 and therefore discusses a common line that controls the two different functions. However, Applicant notes that data line 230, as the signal output line, performs no additional functions simultaneously.

Applicant submits that the proposed combination of Kochi et al., Goto et al., and Street, assuming such combination would even be permissible, would still fail to teach or suggest a signal output line and a line having at least one function of the three functions of a selection control line for controlling the selecting means, a transfer control line for

controlling the transfer means, and a reset control line for controlling the reset means, comprise a single common line in a single unit cell or between two adjoining unit cells, as recited in Claim 2. Accordingly, Applicant submits that Claim 2 is patentable over this prior art, taken separately or in any proper combination.

A review of the other art of record, including Matsunaga et al., Yonemoto, Ohba et al., and Gowda et al., has failed to reveal anything that, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as applied against Claim 2 herein. Therefore, Claim 2 is respectfully submitted to be patentable over the art of record.

Applicant notes that the Office Action, in regard to Gowda et al., states that Gowda et al. teaches a common line functioning as a selection and transfer control line, that is, RSLi applied to transfer means 22 performs both select control and transfer control. Applicant submits, however, that this statement is incorrect. The Gowda et al. sensor selects pixels by controlling the gate potential of the amplifying transistor 23 to operate the transistor 23. That is, the amplifying transistor and the selecting means are commonly provided. As shown in Figure 5, the period of time for outputting a noise and performing sample holding is represented by reference numeral 47, in which RESET is made LOW to select transistor 23 to attain an outputtable state. At this time, the ROW SELECT remains unchanged. Therefore, in the Gowda et al. pixel circuit, both reset control and select control are performed by a common control line in a single unit pixel.

The other claims in this application depend from Claim 2 discussed above, and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual reconsideration of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully

requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,

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